



Remote Sensing in the Houston Ship Channel

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Remote VOC Sensing in the Houston Ship Channel

- Project Objective
- Sensing Technology
- Project Location
- Findings
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 - Heat Exchanger Systems
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- Conclusions



Project Objective

- Utilize the Hawk Camera to find sources of 1,3-Butadiene (butadiene) in the Manchester and Milby Park areas in the near the southwest corner of the Houston Ship Channel(HSC).
- A secondary objective was to use the camera to find potentially under or non-reported point sources (PURPS) of VOCs.



Imaging System

- The infrared gas-imaging camera used by Leak Surveys, Inc., consists of a modified Indigo (FLIR/Indigo Systems Corp., Goleta CA) Merlin MID camera with a nominal spectra range of 1- 5.4 micrometers.
- The spectral range is limited with the use of a notch filter specifically designed for the detection of hydrocarbon infrared adsorptions in the 3-micron region. The narrow bandpass range of the filter is less than the infrared spectral absorption of gas phase hexane. The filter notch is positioned such that alkane gases have a significant response within the bandpass range.



Camera Imagery Example



**Assuming 3.637 grams/gallon at a fill rate of 8 gpm over
24 hr/day, 365 days/yr = approx 16.8 tons/yr of VOCs**

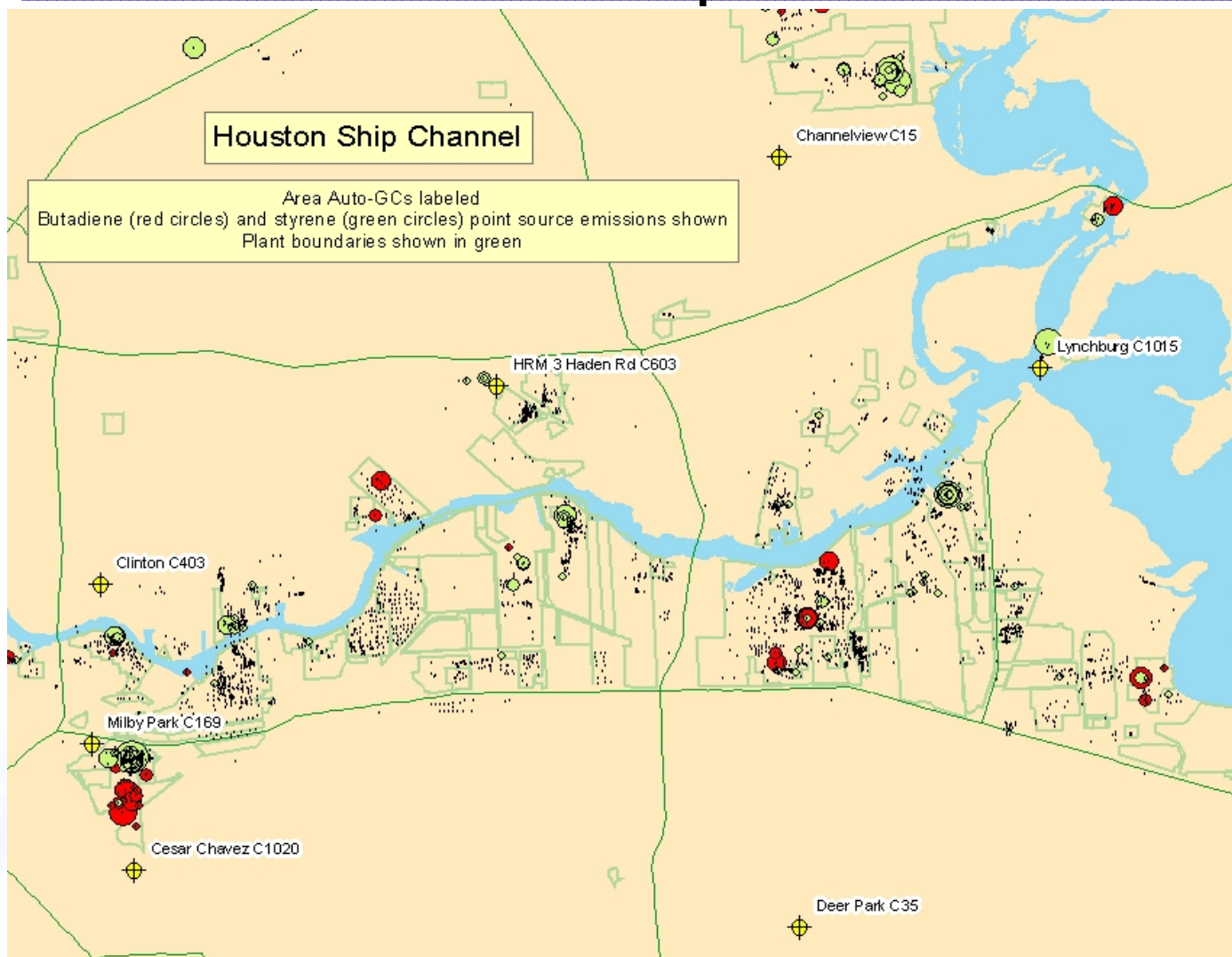


Project Location

- HSC industrial sites near Milby Park including:
 - Goodyear Houston Chemical Plant
 - Mobil Chemical Houston Olefins Plant
 - Texas Petrochemicals Houston Facility
 - Lyondell/Citgo Refinery
 - Valero Refinery
- Other sites:
 - pipeline meter stations
 - gasoline stations
 - oil field production areas
- The project ran for three weeks from February 8 through February 26, 2005.



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SW Portion of the Ship Channel





SW Portion of the Ship Channel





Rail Car Loading





Tanks





More Tanks



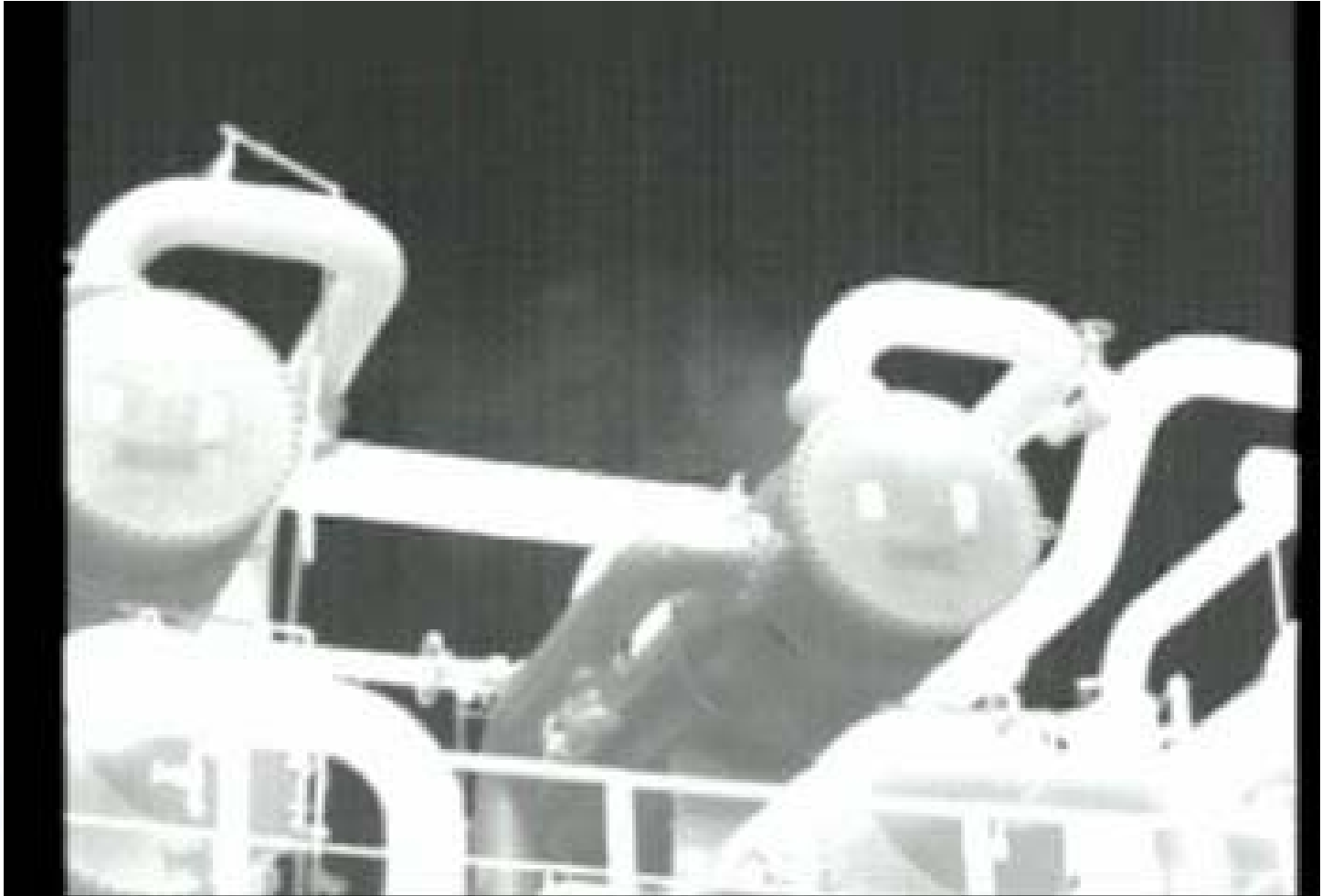


LDAR Components





More Nontraditional Sources





Wastewater Collection





Summary

- Technology holds promise in identifying unsuspected sources of VOC
- Technology cannot speciate or provide quantity, but can detect
- Future uses:
 - Characterization of source emissions
 - Additional LDAR Tool
 - Pipeline and upstream O&G surveys



My Unofficial Conclusion: This technology actually is the best thing since sliced bread!!





Questions?

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